



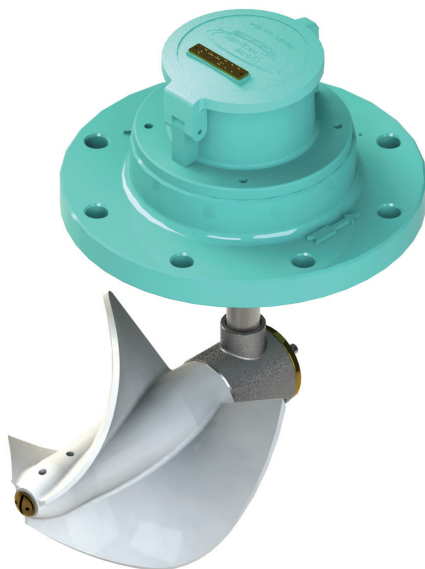
ULTRA MAG

Water Specialties Mainline Flow Meters

**Models MLE MLF MLU TP1 with Mechanical Registers
Sizes 24" - 54"**

**Installation, Operation and
Maintenance Manual**

**Previously for Models
ML03 ML19 MLT1**



30125-99 Rev. 1.0
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Hach's Flow Solutions by



McCROMETER

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SAFETY SYMBOLS AND WARNINGS

Throughout this manual are safety warning and caution information boxes. Each warning and caution box will be identified by a large symbol indicating the type of information contained in the box. The symbols are explained below:



This symbol indicates important safety information. Failure to follow the instructions can result in serious injury or death.



This symbol indicates important information. Failure to follow the instructions can result in permanent damage to the meter or installation site.

Safety Warnings

When installing, operating, and maintaining McCrometer equipment where hazards may be present, you must protect yourself by wearing Personal Protective Equipment (PPE) and be trained to enter confined spaces. Examples of confined spaces are manholes, pumping stations, pipelines, pits, septic tanks, sewage digesters, vaults, degreasers, storage tanks, boilers, and furnaces.

You must follow all state and local laws, as well as Occupational Safety and Health Administration (OSHA) regulations concerning Personal Protective Equipment and confined-space entry. Specific requirements can be found in the OSHA section of the Code of Federal Regulations: 29 CFR, 1910.132 - 1910.140, *Personal Protective Equipment*; and CFR Title 29, Part 1910.146, *Permit-Required Confined-Spaces*.



WARNING!

Incorrect installation or removal of meters can result in serious injury or death. Read the instructions in this manual on the proper procedures carefully.



WARNING!

Never enter a confined space without testing the air at the top, middle, and bottom of the space. The air may be toxic, oxygen deficient, or explosive. Do not trust your senses to determine if the air is safe. You cannot see or smell many toxic gases.



WARNING!

Never enter a confined space without the proper safety equipment. You may need a respirator, gas detector, tripod, lifeline, and other safety equipment.



WARNING!

Never enter a confined space without standby/rescue personnel within earshot. Standby/rescue personnel must know what action to take in case of an emergency.

1.0 INSTALLATION

1.1 **Uncrating**

When uncrating the meter, any damage due to rough or improper handling should be reported to the transportation firm and McCrometer. If for any reason it is determined that the unit or parts of the unit should be returned to the factory, please contact McCrometer for clearance prior to shipment. Each unit must be properly crated to prevent any further damage. The factory assumes no responsibility for equipment damage in return shipment due to improper packaging. The shipping crate contains the following items:

- Main line meter assembly with standard totalizer
- Mounting equipment as required
- Installation, operation, and maintenance manual
- Cutout template (welding saddle meter only)
- Tool T-2402X-1

1.2 **Main line flow meter installation**

Mainline flow meter installation depends upon the type and model of meter selected for each application. The meter must have a full flow of liquid for proper accuracy. Installations described in this manual are:

Flanged tube meter - ML03: see section 1.3

Welding saddle meter - ML19: see section 1.4

Meter head assembly - MLT1: see section 1.7

1.3 **Flanged tube meter installation**

This applies to model ML03.

Flanged tube meters can be installed exactly as you would install any short length of flanged pipe. Flanged ends are standard pattern and drilling for any meter size.

1.4 **Welding saddle meter installation**

This applies to model ML19.

Welding saddle meters can be installed on an existing pipeline by cutting a hole of proper size and welding a meter saddle (furnished with the meter) to the pipe. The installation steps outlined below should be followed carefully to achieve proper mounting of the meter:

1. Align the cutout template in the desired position for the meter on the pipe. Make certain that the center line of the pipe and the center line marked on the template are parallel with each other. Some people prefer to use the saddle as the template.
2. Scribe the pipe along the line specified for your meter size cutout.
3. Cut out the section of pipe within the scribed line and remove all burrs, slag, and rough edges from the inside and outside of the cutout section.

If your meter requires installation straightening vanes, proceed to section 1.5. Otherwise, proceed to section 1.7.

1.5 **Straightening vane installation**

Straightening vanes are recommended when there is less than ten pipe diameters of straight pipe (no fittings or obstructions) directly upstream from the meter location. Straightening vanes are available from the factory and when required should be installed in the following manner, prior to welding the saddle to the pipe:

1. Hold the vanes on the outside of the pipe ten (10) inches upstream from the center of the cutout opening. The vanes must be parallel to the center line of the pipe and should be equally spaced radially 120 degrees apart.

2. Mark the pipe around the straightening vane bolts and burn or drill holes in the pipe where marked.
3. Insert the vanes into the pipe through the saddle cutout opening with the bolts protruding through the holes. Place seal (stainless steel with rubber) washers over each bolt, directly against the pipe. Brass washer should be placed between the washer and the nut. Secure nuts to hold vanes to the pipe. Nuts, bolts and washers not supplied. The vanes can be welded to the pipe if desired. NOTE: **Meter head assembly (#13)** should be removed before welding. (See section 2.3.)

1.6 Welding saddle attachment

This applies to model ML19 only.

Note: Meter head assembly (#13) should be removed before welding. (See section 2.3.)

WELDING SADDLE should be centered over the cutout section of the pipe. Make certain that no part of the pipe protrudes past the inside edge of the welding saddle. Tack weld the saddle to the pipe prior to welding a continuous bead around the saddle.

1.7 Meter assembly installation

See Figure 11. Meter assembly should be placed in the line with the propeller nose facing the upstream flow in the pipe. Use care when installing the meter not to damage the propeller as it passes through the saddle opening. The meter head gasket should be inspected for any sign of damage and replaced if necessary before installing the meter. Tighten the meter head bolts securely.

1.8 Register extension

Instructions for installing the CN02 register extension with a flow meter can be found on the McCrometer Web site. See Lit. # 30116-03.

Direct link to document: <https://bit.ly/3xdYgqB>

Link to Water Specialties document downloads: <https://bit.ly/3rG9Aus>

2.0 MAINTENANCE AND REPAIR

McCrometer products have been carefully designed to be as maintenance free as possible. Periodic preventive maintenance, however, is highly recommended and should be practiced according to schedule to assure continuous accuracy and trouble-free performance of your propeller meters. The maintenance and inspection procedure can also be used as a guide to locating a problem in the unit that may be the cause of abnormal meter operation.

Routine preventative maintenance should be performed on all meters, which includes cleaning and an inspection of the propeller and its bearing. The intervals between inspections depend on the water quality and the usage of the meter. The initial inspection should be performed after one to two years of service, to determine the period between future inspections. After five to ten years, the complete meter should be inspected to insure years of dependable service.

Refer to the table of parts and part numbers (section 2.1) with the line drawing (2.2) on the following pages as you perform maintenance or repair on the meter.

NOTE

The working area chosen for disassembly and reassembly of the internal meter components should be clean to reduce the chance of dust or dirt particles being introduced into the meter mechanism.

2.1 Parts list

All parts listed below are cross-referenced with call-outs in the meter assembly line drawing on the next page. (Figure 1)

No.	Qty.	Part No.	Description
	1	7-MLT1-*	Main line meter head assembly
	1	6-4260	Totalizer & bonnet complete (items 1 through 6)
	1	7-4260	Totalizer & bonnet complete (items 1 through 8)
1	1	5-4316	Totalizer bonnet assembly
	1	1-4317-3	Totalizer bonnet lid (w/pin)
2	1	1-1551-38	O-ring, totalizer bonnet
3	4	1-1115-10-10	Screw, bonnet mounting (ea.)
4	1	5-4260	Totalizer assembly (specify dial)
	1	2-2310-‡	Dial (as specified)
	2	1-1118-3-3	Screw, dial mounting (ea.)
	1	1-4276	Sweep hand
5	1	1-4318	Base cup, totalizer
6	1	1-1551-17	O-ring, base cup
7	1	3-4045	A - Gear assembly (specify # of teeth)
8	1	3-4045	B - Gear assembly (specify # of teeth)
12	1	3-2324	Drive Magnet assembly, totalizer
13A	1	3-2101-24	Meter head (24" - 36")
13B	1	3-2101-42	Meter head (42" - 54")
14	1	3-2461-*	Vertical shaft assembly
15	1	3-2352	Vertical shaft collar & bearing assembly
16	2	1-1113-6-4	Screw, vertical shaft collar & bearing mounting (ea.)
17	1	3-2460-*	Drop pipe & gearbox assembly
18	1	1-1551-17	O-ring, drop pipe
19	8	1-1251-8-16	Bolt, drop pipe mounting (ea.)
20	-	1-1806	Vibra-tite, drop pipe mounting bolt
21	1	4-2459	Miter gear frame assembly (items 22 through 30)
22	1	2-2459	Miter gear frame
23	4	1-1504-2	Bearing, miter gear frame (ea.)
24	1	3-2458	Driven magnet & shaft assembly
25	1	2-2354	Driven magnet spacer
26	1	3-2349	Drive miter gear assembly
27	1	3-2137	Driven miter gear assembly
28	2	2-2148	Shim washer (ea.)
29	1	2-2138	Driven miter gear shaft
30	1	1-1551-2	O-ring, miter gear frame

No.	Qty.	Part No.	Description
33	4	1-1103-8-7	Screw, miter gear frame mounting (ea.)
34	1	4-2455-2	Separator/support spindle assembly
35	1	2-2455-2	Separator/support spindle
36	1	1-1508-20	Ceramic sleeve for support spindle
37	4	1-1103-8-7	Screw, separator/spindle mounting (ea.)
38	1	1-1551-24	O-ring, separator/spindle
39	1	5-2425-14.0	Propeller assembly (items 40 through 51)
40	1	3-2425-14.0-T	Propeller
41	1	4-2426-1	Ceramic bearing cartridge
42	1	1-1116-8-6	Screw, ceramic bearing cartridge mounting
43	1	1-1601-2	Drive magnet
44	1	1-2428-‡	Drive magnet retaining plate
45	2	1-1115-3-18	Screw, drive magnet retaining plate (ea.)
46	1	3-2402-2	Reverse thrust bearing cartridge assembly
47	1	1-1101-8-5	Set screw, thrust bearing
48	2	1-1509-1	Ceramic thrust bearing, 3/16" diameter (ea.)
49	1	1-1125-6	Set screw, nylon tip
50	1	3-2356	Thrust bearing cartridge assembly
51	2	1-1510-1	Ceramic thrust bearing, 1/4" diameter (ea.)
52A	1	1-1557-14	Gasket, meter head (24"-36")
52B	1	1-1557-24	Gasket, meter head (42"-54")
53A	12	1-1253-14-13	Bolt, meter head 1 NC x 3 (24"-36") (ea.)
53B	20	1-1253-15-17	Bolt, meter head 1 1/4" NC x 4" (42"-54")
54A	12	1-1219	Nut, meter head bolt, 1 NC (24"-36") (ea.)
54B	20	1-1223	Nut, meter head bolt, 1 1/4" NC (42"-54")
55A	12	1-1301-12-1	Washer, meter head bolt, 1" (24"-36") (ea.)
55B	20	1-1301-14-1	Washer, meter head bolt, 1 1/4" (42"-54")
-	--	1-1804-2	Gearbox oil (16 oz.)
-	1	1-1607-5	Desiccant capsule

* Insert meter size to complete part number (use -24 for 24"; -30 for 30", etc.)

‡ Consult factory to complete part number

When ordering replacement parts, please specify:

- Meter Size
- Meter Model
- Meter Serial Number

2.2 Meter assembly drawing

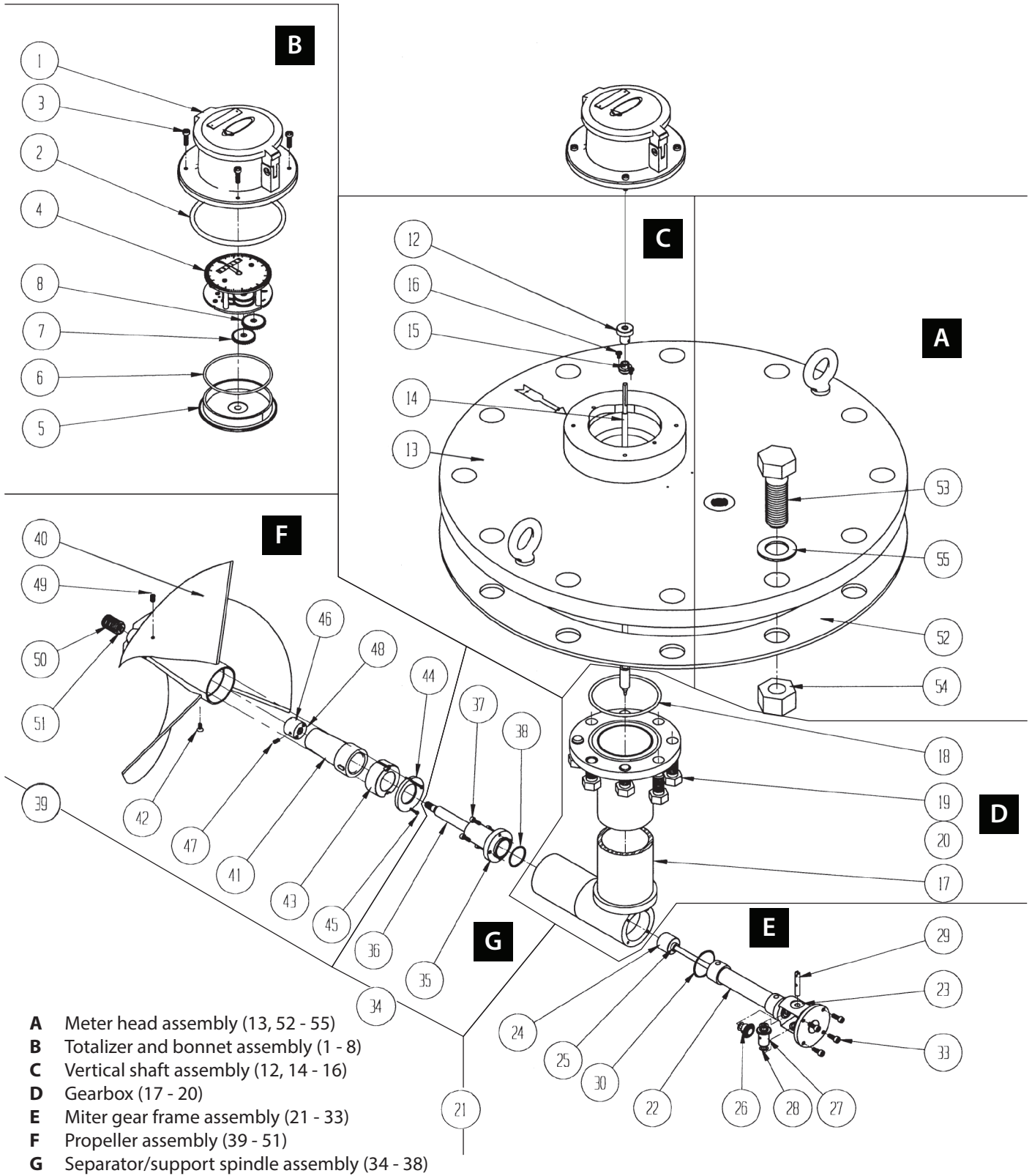


Figure 1. Full meter assembly with call-outs

2.3 Removing the meter head assembly

Refer to Figure 2 and Figure 3.

Remove the meter head assembly (#13) from the service line by removing the **meter head bolts (#53)** and lifting up the rear (downstream) portion of the meter head (#13).

Carefully pull the assembly back (downstream) and up at the same time to allow the **propeller (#40)** to clear the inside of the meter saddle and be lifted free.

Inspect the **meter head gasket (#52)** for any sign of damage and replace if necessary. Replace the meter head assembly (#13) with a dummy cover plate if the service line is to remain in operation.

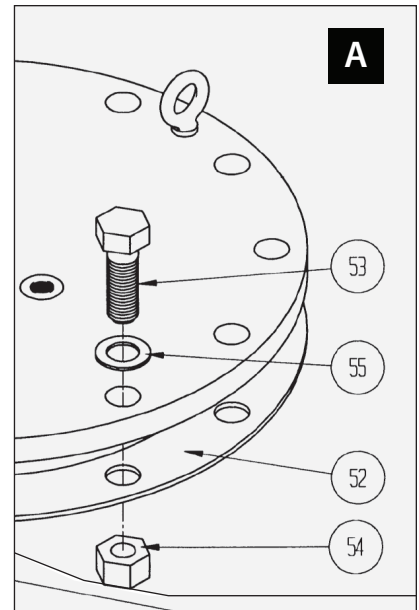


Figure 2. Meter head assembly

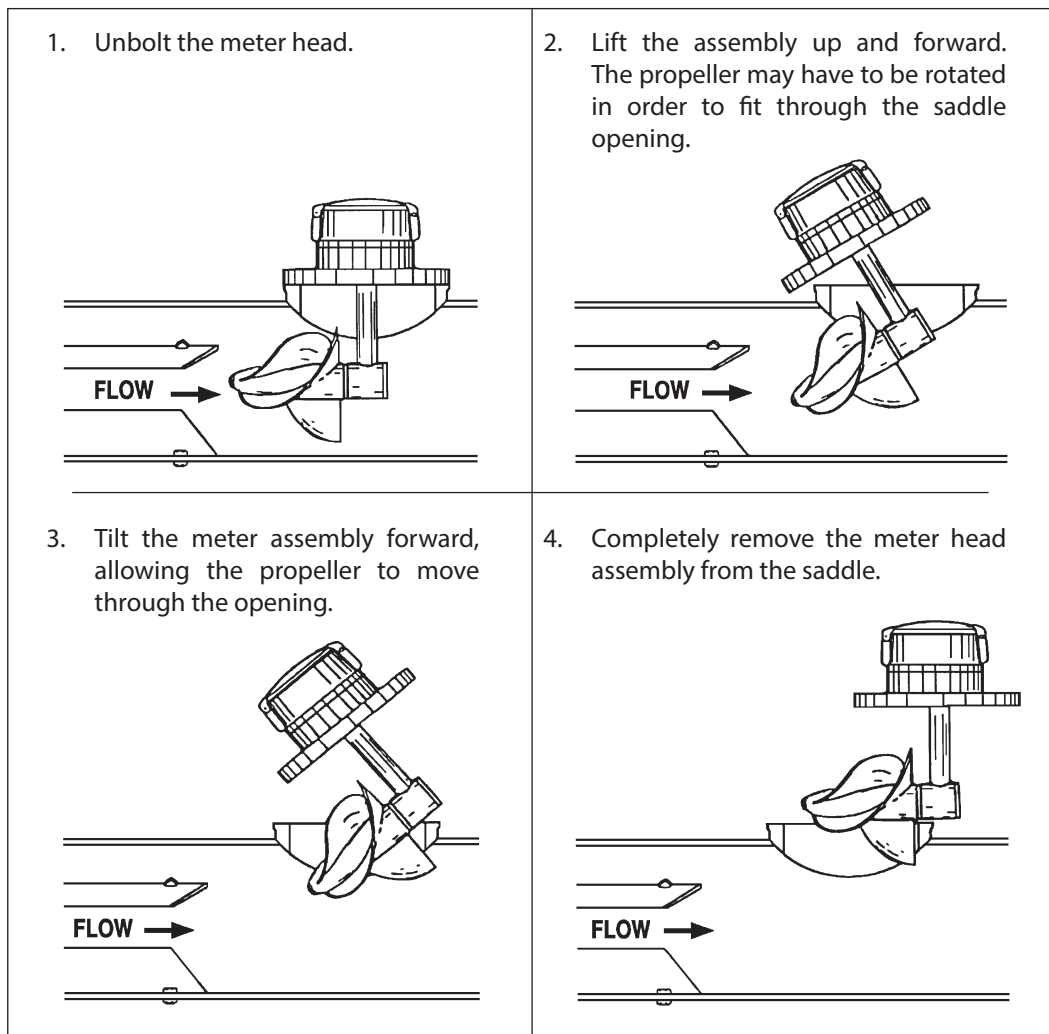


Figure 3. Meter head assembly removal

2.4 Service procedure

The service procedure involves removing, cleaning, and inspecting the meter’s components and assemblies for wear and damage. It is performed in this order:

Section	Procedure
3.3	Meter head assembly removal
3.4	Routine cleaning and inspection of the assemblies
3.4.1	Totalizer assembly
3.4.2	Vertical shaft assembly and gearbox
3.4.3	Miter gear frame assembly
3.4.4	Propeller assembly
3.5	Component inspection
3.6	Meter reassembly
3.7	Meter head assembly reinstallation

I Inspect all internal meter parts as you proceed. If any meter parts appear to be damaged or excessively worn, replace them to ensure proper meter operation and prevent further damage.

2.4.1 Clean and inspect totalizer assembly

Refer to Figure 4 at right.

Totalizer assembly (#4) service procedure should include cleaning and inspection of the unit noting any excessive wear on the **totalizer change gears (#7 & #8)** that may lead to operational problems in the unit.

1. Remove the **bonnet mounting screws (#3)** and lift the entire **totalizer bonnet (#1)** off of the meter.

The totalizer assembly (#4) is contained within the totalizer bonnet (#1) and held in place by a **base cup (#5)**. It should not be necessary to remove the totalizer assembly (#4) during inspection. However it is necessary to remove the base cup (#5) to inspect the totalizer change gears (#7 & #8).

2. Remove the base cup (#5) by inserting a small screwdriver into the two cutouts and prying it upward under the edge.
3. Inspect the totalizer change gears (#7 & #8) for any sign of wear.

Both the A-(drive) gear and B-(driven) gear are attached to the lower portion of the totalizer assembly (#4). Spin the floating totalizer driven magnet in the center of the bottom of the totalizer assembly (#4) to make certain it spins freely without bind or drag. The bottom of the totalizer has the letter “A” molded next to the A-drive gear shaft, and the letter “B” next to the B-driven gear shaft.

4. Check the **totalizer drive magnet assembly (#12)** located in the meter head (#13) at the top of the **vertical shaft assembly (#14)** and make adjustments if necessary.

The totalizer drive magnet assembly (#12) must be positioned 1/16 inch below the top surface of the meter head (#13). Loosen the **socket head set screw (#16)** in the side of the totalizer drive magnet assembly (#12) and slide it up or down the vertical shaft (#14) as desired. Always be sure the set screw is tightened into the flat on the vertical shaft (#14).

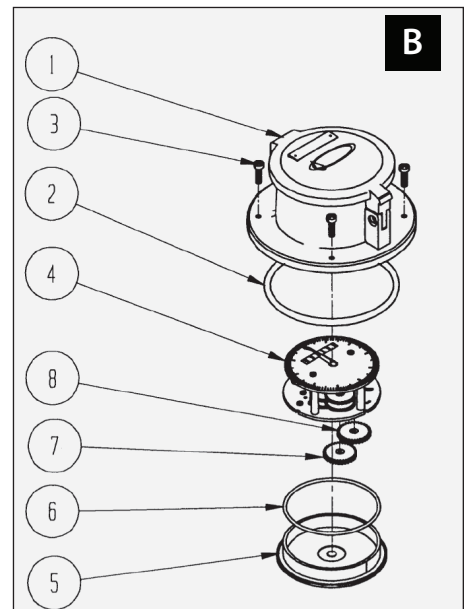


Figure 4. Totalizer and bonnet complete assembly

2.4.2 Remove and inspect vertical shaft assembly and gearbox

Refer to Figure 5 at right.

The **gearbox (#17)** is sealed and filled with gearbox oil. Before disassembling the lower meter assembly, the oil must be drained.

1. Remove two screws (#16) inside the meter head (#13).
2. Pull the vertical shaft assembly (#14) directly out the top of the meter.
3. Turn the meter over onto the meter head (#13) and drain the oil from the gearbox (#17) into a container.
4. Spin the upper **bearing assembly (#15)** gently, checking for any sign of wear.
5. Inspect the vertical shaft assembly (#14) to be sure it is not bent or damaged.

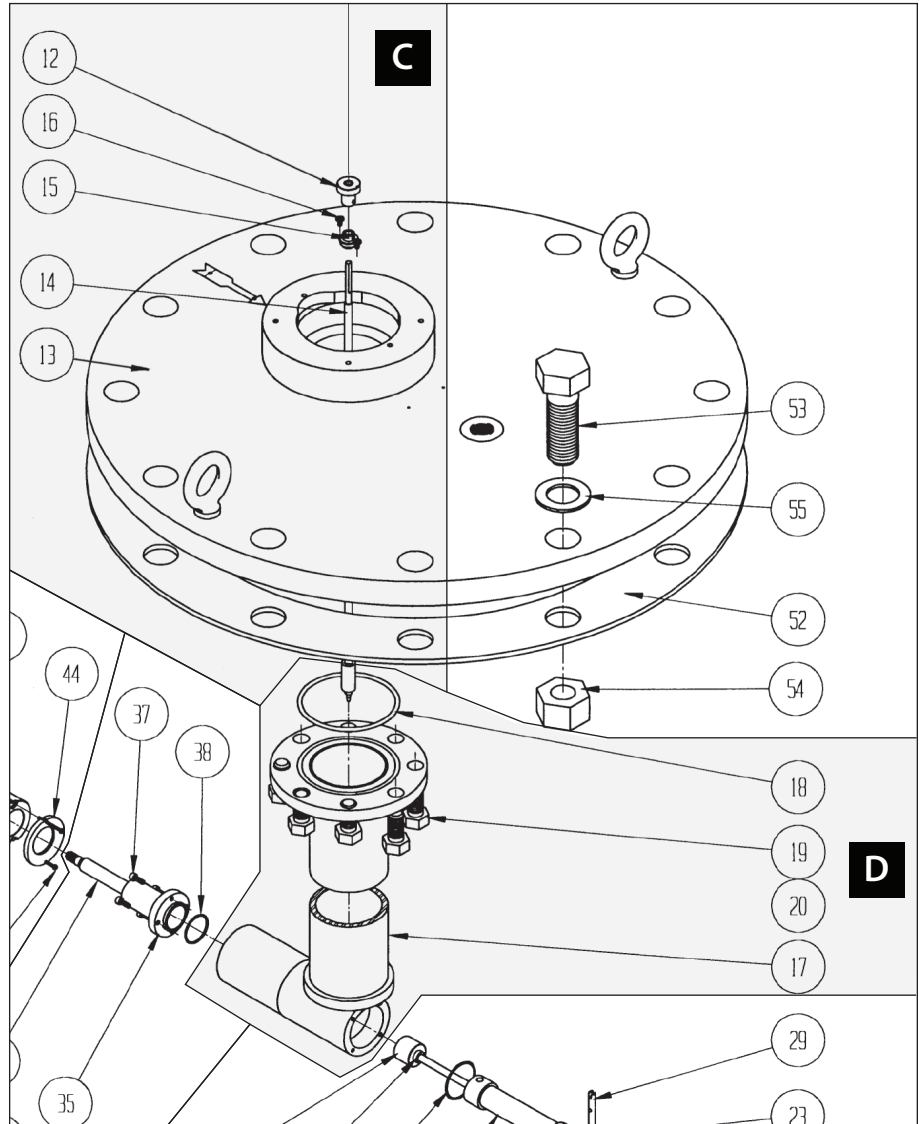


Figure 5. Vertical shaft assembly and gearbox

2.4.3 Remove and inspect miter gear frame assembly

Refer to Figure 6 at right.

Remove the **miter gear frame assembly (#21)** and inspect for wear.

1. Remove **four screws (#33)** and pull the entire miter gear frame assembly (#21) out of the back of the gearbox (#17).
2. Spin the **driven magnet (#24)** to make sure the unit runs freely.
3. Inspect the teeth on both the **drive miter gear assembly (#26)** and the **driven miter gear assembly (#27)** for any sign of excessive wear.

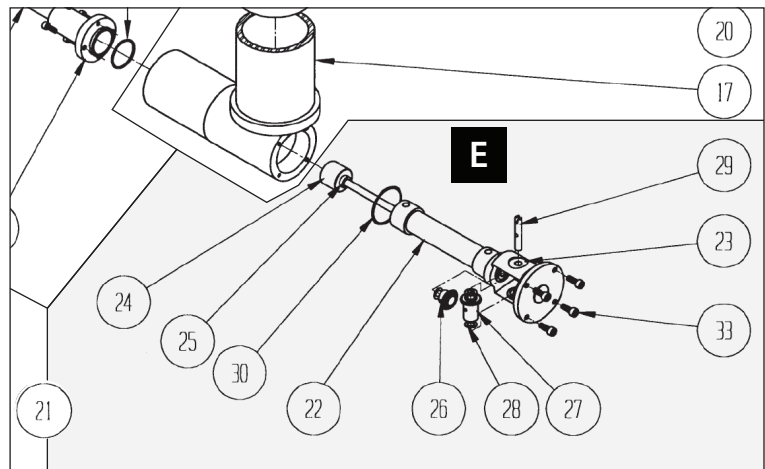


Figure 6. Miter gear frame assembly

c. Insert tool T-2402X-1 (Figure 8) into the propeller through the threaded nose. The tabs in the tool should engage in the screwdriver slot in the end of the reverse thrust bearing cartridge (#46).

d. Remove the propeller assembly (#39) and reverse thrust bearing cartridge (#46) by turning tool T-2402X-1 counterclockwise unscrewing the reverse thrust bearing cartridge (#46) from the **separator/support spindle (#35)**. The propeller assembly with reverse flow cartridge will now slide off the spindle.

WARNING: If the reverse thrust cartridge does not unscrew easily, it may be because the set screw was not unscrewed enough. If unscrewing the reverse flow cartridge is continued with the set screw binding on spindle thread, damage to thread could occur.

3. Perform water lubrication of the **ceramic sleeve (#36)** by means of two openings in the end of the thrust bearing cartridge (#50) which allows air to be purged from the bearing area. Clear them of any foreign

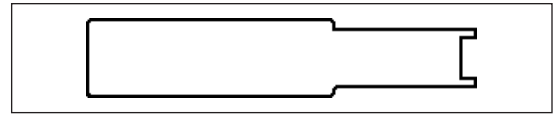


Figure 8. Tool T-2402X-1

material by running a small wire through the holes on either side of the screwdriver slot.

4. Clean the ceramic bearing cartridge (#41) and drive magnet (#43) of any foreign material and inspect for damage.
 - a. Using a bottle brush, thoroughly clean the ceramic bearing surface (#41) and the inside diameter of the drive magnet (#43).
 - b. After cleaning the propeller, flush the inside out with water. The outside surfaces of the propeller should also be cleaned to assure a smooth, unrestricted flow across the surface of the propeller. Do not use an oil-based solvent in cleaning, as damage to the assembly could occur.

2.4.5 Remove and clean separator/support spindle assembly

Refer to Figure 9 at right.

Clean the separator/support spindle assembly (#34) as follows:

1. Clean the spindle ceramic sleeve (#36) and the O.D. or surface of the separator/support separator (#35) and inspect for any substantial amount of wear.
2. Check the thrust bearing (#50) for any damage. If it is determined that the spindle ceramic sleeve (#36) or separator (#35) are worn sufficiently, replace the separator/support spindle assembly (#34). The removal procedure is as follows:
 - a. Removing the **four mounting screws (#37)** which thread into the drop pipe.
 - b. Replace the **separator O-ring (#38)** and apply a thin coat of silicone grease to it.
 - c. The separator/support spindle assembly (#34) can then be replaced in the front of the drop pipe (#17) with a firm push, gently rotating the assembly at the same time.
 - d. Replace and tighten the four mounting screws (#37).

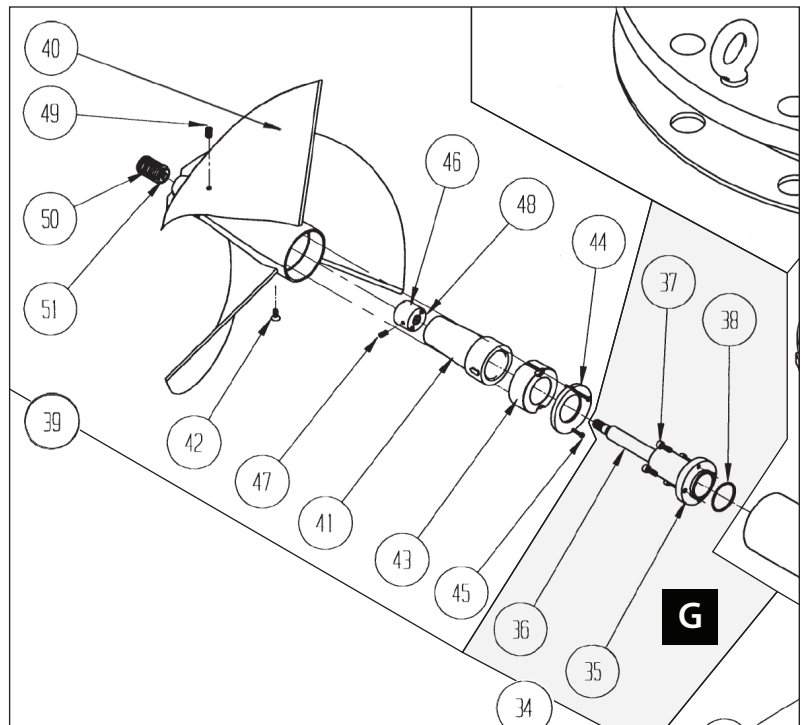


Figure 9. Separator/support spindle assembly

2.4.6 Reinstall propeller and propeller assembly

Refer to Figure 7 above.

1. Install the propeller as follows:
 - a. The reverse thrust cartridge set screw (#47) should be protruding out of the reverse thrust bearing cartridge so it will not bind up on the spindle thread.

NOTE: Look through the end of the propeller and hole in the reverse thrust cartridge to be sure the set screw is not showing.
 - b. Slide the propeller assembly onto the support spindle (#18) until the reverse thrust bearing cartridge (#46) contacts the threads on the end of the spindle (#35).
 - c. Using tool T-2402X-1, thread the reverse thrust bearing cartridge onto the spindle. If you feel any resistance when threading the reverse thrust cartridge on, stop at once and check to be sure the set screw is not binding on the thread. Be careful not to cross-thread the reverse thrust bearing cartridge.
 - d. Thread the reverse thrust bearing cartridge (#46) onto the spindle (#35) until the trailing edge of the propeller contacts the drop pipe (#17).
 - e. Set the proper end play by inserting a 5/64" Allen wrench into the reverse thrust bearing set screw (through the side of the propeller) and loosen the reverse thrust bearing cartridge (#46) 1/2 turn counterclockwise.
 - f. Tighten the set screw in reverse thrust bearing cartridge. There should be approximately .020" clearance between the drop pipe (#17) and trailing edge of the propeller when the propeller is pulled forward (away from the drop pipe). The propeller must not contact the drop pipe.
2. Inspect the thrust bearing cartridge assembly (#50) in the nose of the propeller and replace worn or damaged parts.
 - a. The thrust bearing cartridge (#50) is used to adjust the amount of longitudinal end play of the propeller assembly on its spindle (#35), which should be about 1/64 inch. End play can be adjusted by turning the thrust bearing cartridge assembly (#50) clockwise until it tightens against the end of the support spindle (#35), then turning thrust bearing cartridge (#50) counterclockwise 1/8 of a turn.
 - b. Tighten set screw (#49).
 - c. Check the longitudinal end play of the propeller to insure it is not excessive and does not allow the propeller (#40) to contact the drop pipe (#17).
 - d. Check the clearance between the propeller (#40) and drop pipe (#17). The clearance should be approximately .010" between the drop pipe (#17) and trailing edge of the propeller when the propeller is pushed back (toward the drop pipe). The propeller assembly (#39) must spin freely.
3. Check the propeller bearing (#41) for excessive radial play by rocking the propeller (#39) gently from side to side on the spindle (#35). Some play is required for proper operation of the water lubricated ceramic sleeve bearing.

2.5 Reassembling the meter assembly

Refer to Figure 10 on next page.

Reassembly is necessary at this point. Before reassembling any parts, make certain that each is cleaned of any dust or dirt and properly lubricated. Cost for replacement parts not covered by warranty are available from current parts and price list. If it is determined that the meter should be returned for repair, please notify McCrometer prior to shipment. Each meter must be properly packaged to prevent damage to the meter in shipment.

1. Replace the **miter gear frame assembly (#21)** in the back of the gearbox (#17) as follows:
 - a. Firmly push the miter gear frame assembly (#21) into the gearbox (#17), gently rotating the assembly at the same time.
 - b. Replace the **miter gear frame O-ring (#30)** and cover the new O-ring with a thin coat of silicone grease before replacing the assembly (#21). Make certain that the assembly is installed in a position such that the drive clevis portion of the driven miter gear shaft (#29) can accept the driven clevis portion of the vertical shaft assembly (#14).
 - c. Secure with four mounting screws (#33).
2. Fill the gearbox (#17).

Fill the gearbox (#17) with three ounces of 10w mineral oil. A small funnel or an oil can with a small nozzle will make filling the gearbox (#17) easier. Pour the oil through the opening in the top of the meter head (#13).

3. Insert the vertical shaft assembly (#14) as follows.
 - a. Gently insert the vertical shaft assembly (#14) into the gearbox (#17) through the opening in the top of the meter head (#13).
 - b. Rotate the shaft gently until it is engaged in the driven miter gear shaft (#29) of the miter gear frame assembly (#21).
 - c. Replace and secure two screws (#16) that hold the upper bearing (#15) in place. Do not overtighten the screws (#16) as this could cock the bearing (#15) and bind the vertical shaft (#14).
 - d. Turn the top of the vertical shaft (#14) to check for any bind or drag. Should any bind or drag be apparent, it can usually be corrected by adjusting the vertical shaft collar and bearing assembly (#15).
 - e. Loosen the set screw (#16) in the side of the assembly (#15) and slide the shaft (#14) downward until it rests against the driven miter gear shaft (#29), then lift up about 1/64 inch.
 - f. Tighten set screw (#16).
4. Check the totalizer drive magnet assembly (#12) again to make certain it is properly set to drive the totalizer (#4). (See section 2.4.1 step 4.)
5. Place the totalizer base cup (#5) back in the totalizer bonnet (#1) on the totalizer assembly (#4) after the desiccant capsule and **base cup O-ring (#6)** are replaced. Be the sure O-ring (#6) is on base cup (#5) properly.
6. Clean the bonnet assembly (#1) and place it on the meter head (#13).

The **bonnet O-ring (#2)** should be replaced and the new O-ring (#2) covered with a thin coat of silicone grease. Secure with four screws (#3).

7. Dip the propeller assembly (#39) in water to lubricate the propeller ceramic sleeve bearing (#41) and spin the propeller (#40) gently to make certain the meter operates smoothly and no bind or drag is apparent.
8. Inspect the meter head gasket (#52) for any sign of damage and replaced if necessary. The meter can now be installed in the service line.

When replacing the meter on the line, make certain that the top of the welding saddle is smooth and free of any foreign material. Make certain that no foreign materials are attached to the inside of the service line pipe, as any flow disturbance or obstruction may affect the accuracy of the meter.

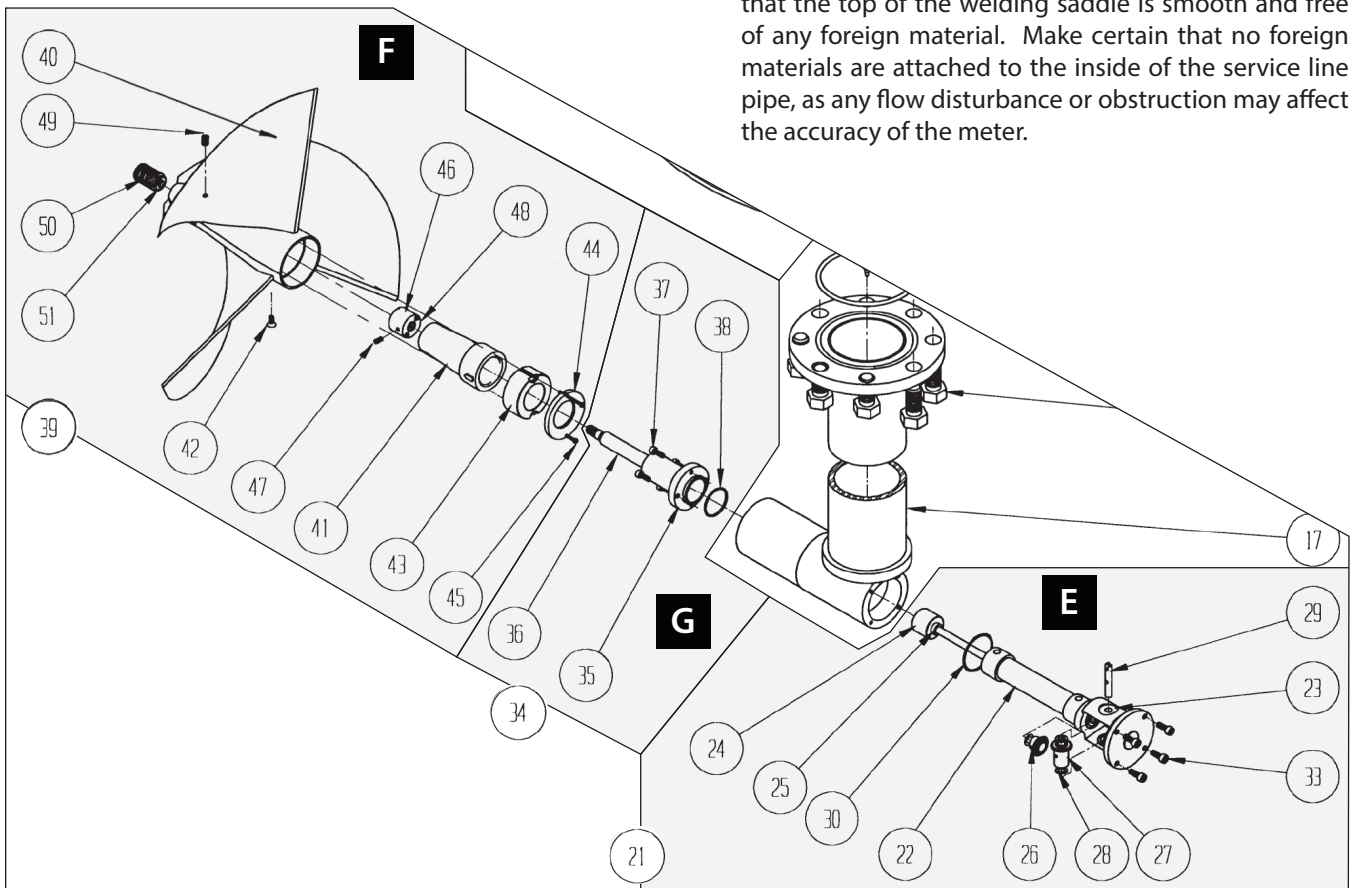


Figure 10. Reassembling the meter assembly

2.6 Reinstalling the meter head assembly

See section 1.7. This procedure applies to both new meter head installation and reinstallation of meter head after maintenance. (Figure 11)

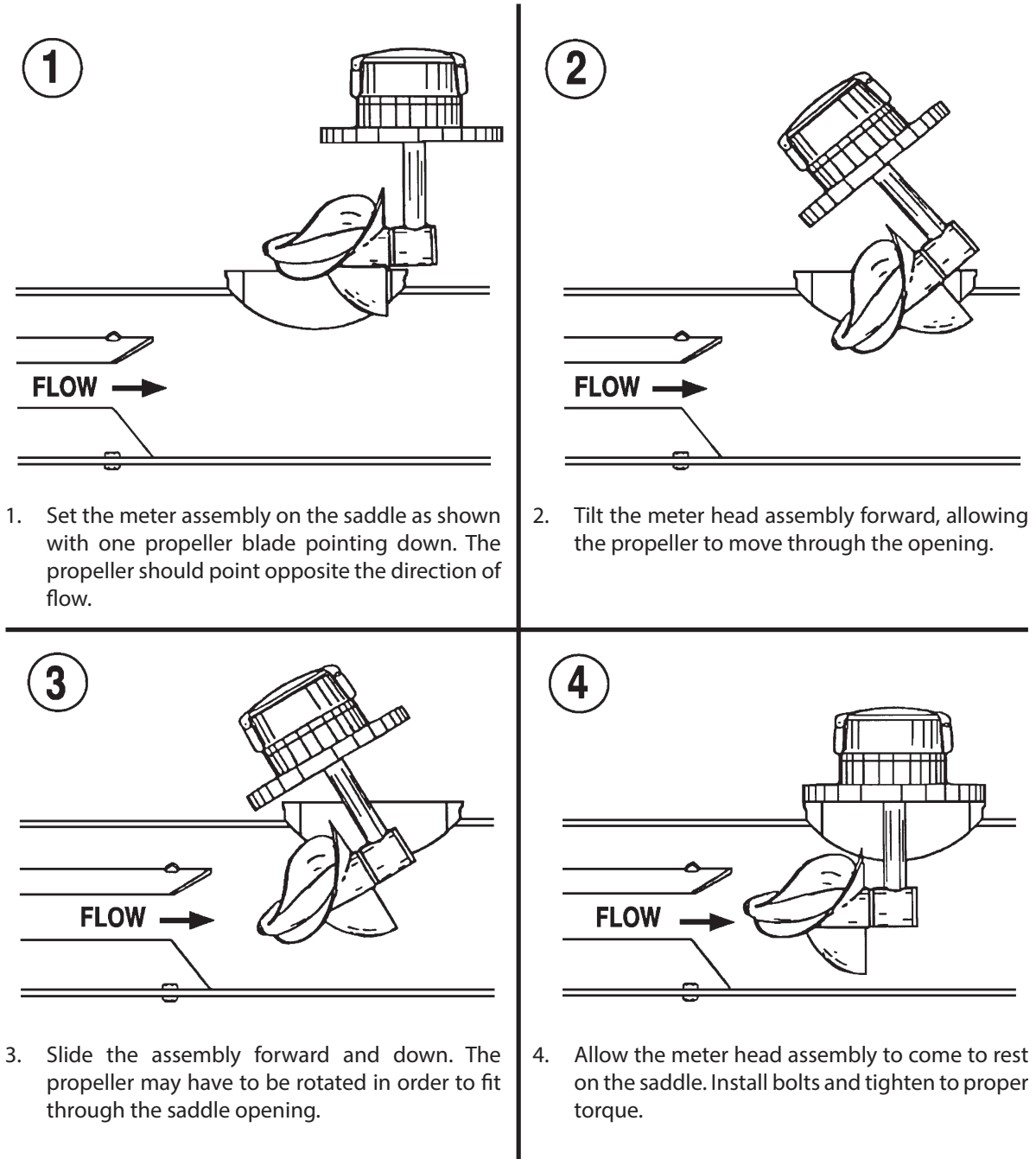
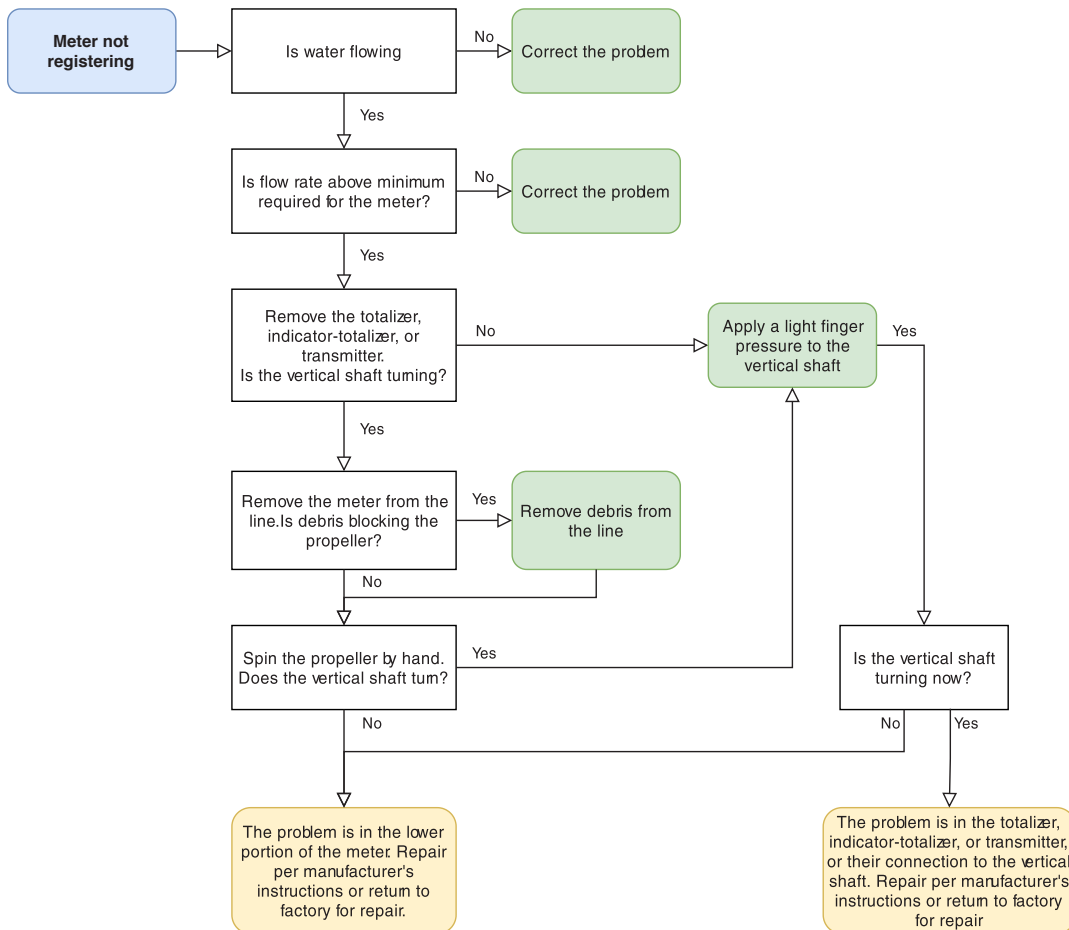
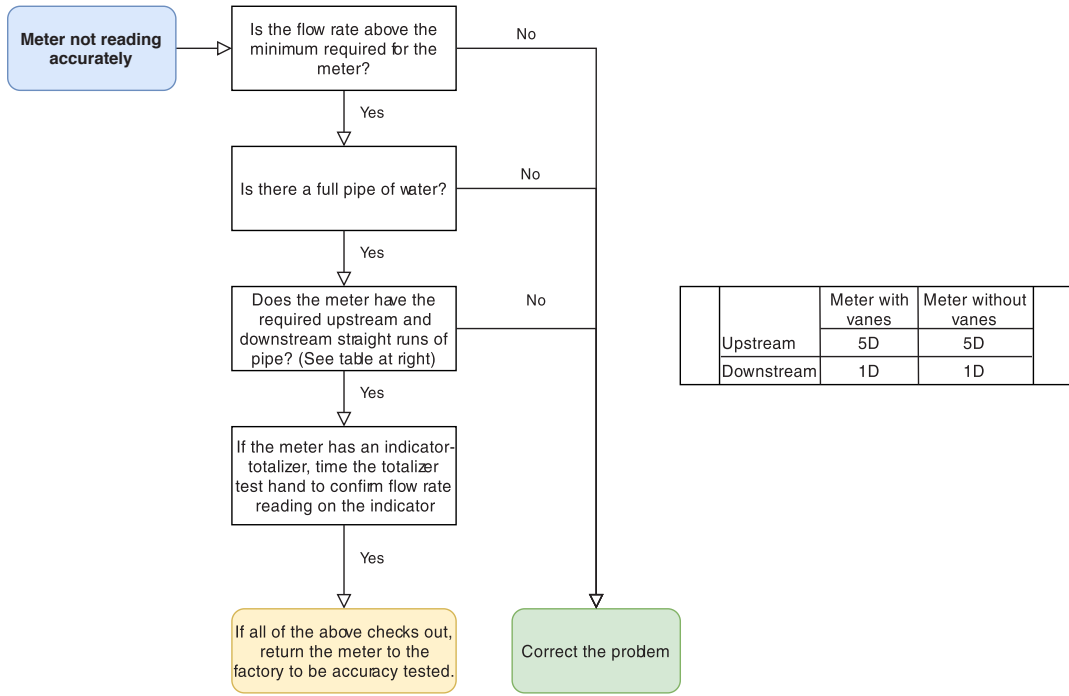


Figure 11. Meter head installation

3.0 TROUBLESHOOTING AND SERVICE SCHEDULE



4.0 ORDERING REPLACEMENT PARTS

When ordering replacement parts, the meter's serial number is needed to ensure correct replacements. The serial number can be found on the register canopy lid. The number sequence should look similar to: 18-01234-06. The first two digits are the year of manufacture, the second set of digits is the number of the meter, and the last set of digits is nominal line size. For meters manufactured before 1994, the last sets of digits are reversed. For specific meter part numbers, see the table of part numbers and line drawing on page 4 and page 5.

5.0 RETURNING A UNIT FOR REPAIR

If the unit needs to be returned to the factory for repair, please do the following:

Prior to calling for a return authorization number, determine the model number, serial number (located inside the front panel of the converter), and reason for return.

- Contact McCrometer Customer Service Department and ask for a Return Authorization (RA) number.
 - Telephone: 1-800-220-2279
 - Email: customerservice@mccrometer.com
- Ship the meter in the original packaging, if possible. Do not ship manuals, power cords, or other parts with your unit unless required for repair.
- Please make sure the meter is clean and free from foreign debris prior to shipping.
- Write the RA number on the outside of the shipping box. All return shipments should be insured.
- Address all shipments to:

McCrometer, Inc.
RA #
3255 W. Stetson Avenue
Hemet, CA 92545

WARRANTY

McCrometer warrants that this product will be free from defects in material and workmanship for a period 12 months from the date the equipment was first installed, but in no event longer than 18 months from the date the equipment was first shipped by McCrometer. Repairs shall be warranted for 12 months or, if the repair is performed under this warranty, for the remainder of the original warranty period, whichever is less.

Buyer shall report any claimed defect in writing to McCrometer immediately upon discovery and in any event, within the warranty period. McCrometer shall, at its sole option, repair the equipment or furnish replacement equipment or parts thereof, at the original delivery point.

McCrometer shall not be liable for costs of removal, reinstallation, or gaining access. If Buyer or others repair, replace, or adjust equipment or parts without McCrometer prior written approval, McCrometer is relieved of any further obligation to Buyer under this Article with respect to such equipment.

No equipment furnished by McCrometer shall be deemed to be defective by reason of normal wear and tear, failure to resist erosive or corrosive action of any fluid or gas (unless otherwise specified in Quotations/ Purchase Order Specifications), Buyer's direct or indirect failure (or the failure of its agents or contractors) to properly store, install, operate, or maintain the equipment in accordance with good industry practices or specific recommendations of McCrometer, or Buyer's failure to provide complete and accurate information to McCrometer concerning the operational application of the equipment.

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Purchaser's sole remedy and manufacturer's sole obligation for alleged product failure, whether under warranty claim or otherwise, shall be the aforesaid obligation of manufacturer to repair or replace products returned within twenty-four months after date of original shipment. The manufacturer shall not be liable for, and the purchaser assumes and agrees to indemnify and save harmless the manufacturer in respect to, any loss or damage that may arise through the use by the purchaser of any of the manufacturer's products.

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